Acta Zootaxonomica Sinica, 37 (3): 546 – 549 (July 2012) ISSN 1000-0739

A NEW SPECIES OF THE GENUS *HOLCAUCHEN* FROM NORTH SICHUAN, CHINA (STYLOMMATOPHORA, ENOIDEA)

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Abstract A new enid species *Holcauchen nanping* sp. nov. is described from North Sichuan. The new species is characterized by the most swollen part occurred at penultimate whorl, the absence of parietal or palatal tooth and the presence of one columellar tooth and in genitalia, it has a short knob-like flagellum, but has no epiphallic caecum and no diverticle on bursa copulatrix duct.

Key words Enoidea, Enidae, *Holcauchen*, new species, North Sichuan.

1 Introduction

Holcauchen Möllendorff, 1901 is an enid genus, which is endemic to the Western mountains of China. The animals are characterized by the slender shell where the aperture insertions are closely connected by the thickened callus, which is not the same as those "nearly adnate" in *Serina* Gredler, 1898 (Schileyko, 1998). The genus is composed of sixteen known species and subspecies (Ancey, 1882; Annandale, 1923; Gredler, 1898 a & b; Haas, 1933; Hilber, 1883; Kobelt, 1899 – 1902; Möllendorff, 1901; Pilsbry, 1934; Wiegmann, 1901; Chen & Zhang, 2000; Chen, Zhou *et al.*, 2003; Wu, 2012; Yen, 1939, 1942; Zilch, 1974). The members of the genus show a variable development of the apertural armature as occurred in the other China's indigenous genera *Pupopsis* Gredler, 1898 (Wu & Gao, 2010), *Clausiliopsis* (Wu & Wu, 2009) and *Serina* (Wu & Xu, in review).

2 Methods

Living specimens relaxed by being drowned in water were transferred to 70 % ethanol before being replaced with ethanol of the same concentration after about 3 d. Shell and genitalia were measured with a calibrated digital vernier calliper and on photo respectively, both to the nearest 0.1 mm. Whorl numbers were counted as described by Kerney & Cameron (1979) and taken with 1/8 (0.125) whorl accuracy. Measurements of soft parts were taken from the specimens preserved in 70 % ethanol. Directions used in descriptions: proximal = towards the genital atrium; distal = away from the genital atrium.

3 Systematic Account

Stylommatophora Schmidt, 1855

Enoidea Woodward, 1903

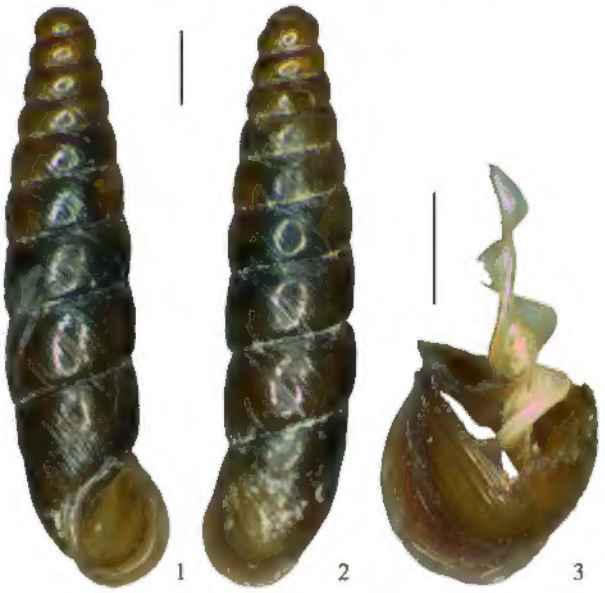
Enidae Woodward, 1903

Holcauchen Möllendorff, 1901

Buliminus (*Holcauchen*) Möllendorff, 1901: 362; Wiegmann, 1901: 276. Type species: *Buliminus sulcatus* Möllendorff, 1901; original designation.

Holcauchen nanping sp. nov. (Figs 1 – 4)

Diagnosis. Most swollen part occurred at penultimate whorl. Parietal or palatal tooth absent. Columellar with 1 tooth. 9.875 whorls; 7.8 mm high; 2.3 mm in diam. maj. Epiphallic caecum absent. Flagellum knob-like. Diverticle absent.



Figs 1 – 3. *Holcauchen nanping* sp. nov., HBUMM06584-specimen 1, holotype. 1. Apertural view. 2. Abapertural view. 3. Inside view of aperture, showing the columellar tooth. Scale bars = 1 mm.

Holotype, HBUMM06584-specimen 1, fully mature animal; Fengchengsi, Jiuzhaigou County, North

Projects respectively supported by the National Natural Sciences Foundation of China (31071882, J1103512) and the Science and Technology Ministry (2006FY120100).

Received 16 May 2012, accepted 25 June 2012.

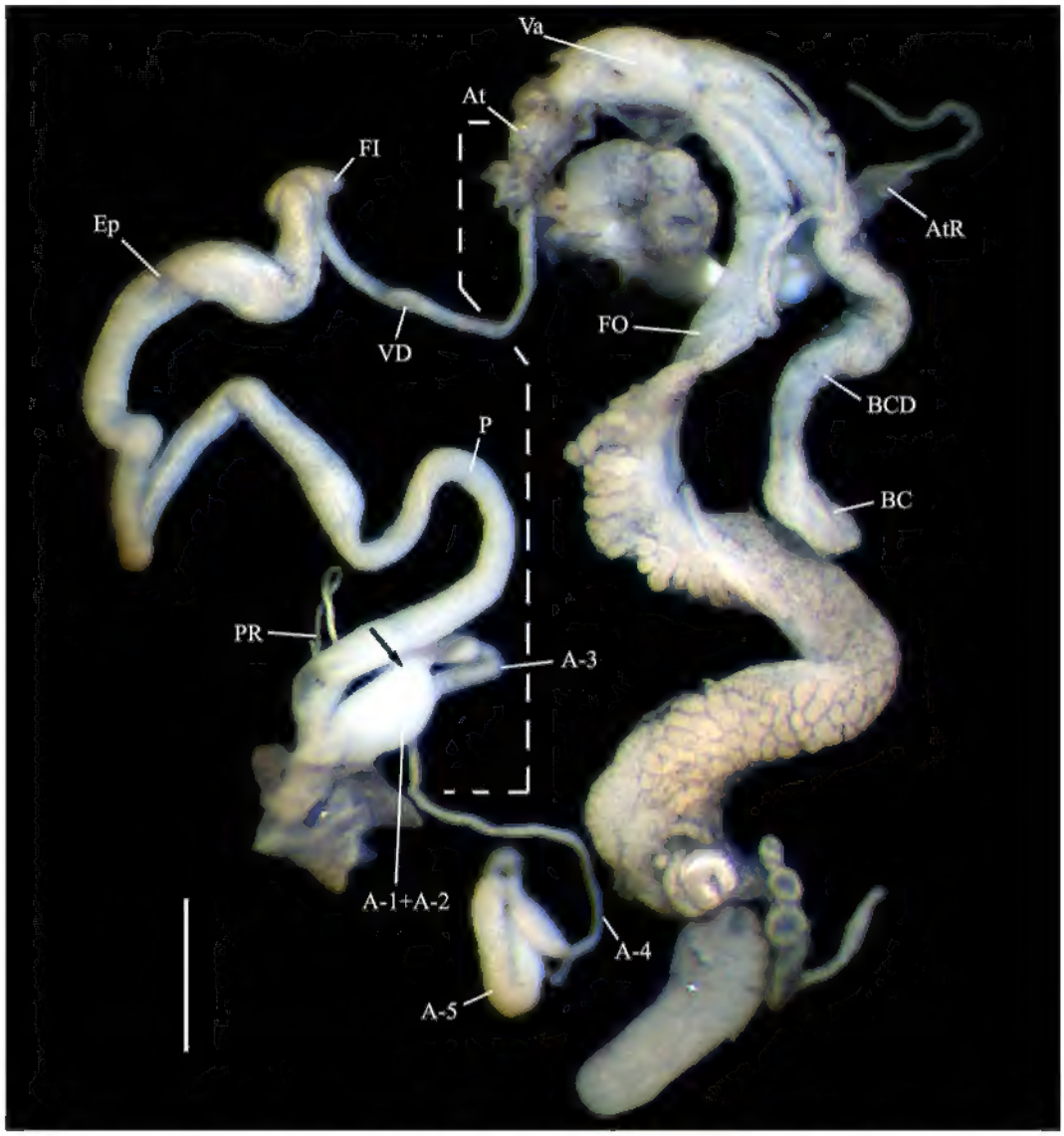


Fig. 4. *Holcauchen nanping* sp. nov., HBUMM06584-specimen 1, holotype. Genitalia with male and female parts separated. Arrow indicates the insertion of retractor muscle branch of penial appendix. At. Atrium. AtR. Atrial retractor muscle. A-1. Most proximal section of penial appendix. A-2. Penial appendix section between and thicker than A-1 and A-3, usually bulb-shaped. A-3. Section of the penial appendix connecting proximally A-2 and distally A-4. A-4. Thinnest part of the penial appendix between A-5 and A-3. A-5. Distal part of the penial appendix, more or less swollen. BC. Bursa copulatrix. BCD. Bursa copulatrix duct. Ep. Epiphallus. Fl. Flagellum. FO. Free oviduct. P. Penis. PR. Retractor muscle of the penial branch. Va. Vagina. VD. Vas deferens. Scale bars = 0.5 mm.

Sichuan (33° 15′ N, 104°14′E; alt. 1 515 m); 14 Aug. 2011; coll. WU Min, XU Qin and Prem. B. Buhda. The type is deposited in the Museum of Hebei University, Baoding, China.

Etymology. The new species is named after the earlier name of Jiuzhaigou "Nanping" which means southern level ground in Chinese. The epithet is a noun in opposition.

Distribution. North Sichuan, only known from type locality.

Shell. Elongate-ovate; apex not acuminate; dextral; thin-shelled; solid; semitranslucent; glossy; with most swollen part occurred at penultimate whorl; with 9.875 whorls; 7.8 mm high; 2.3 mm in diam. maj. Height/diam. maj. ratio 3.47. Growthlines usually not very clear. Whorls somewhat convex; not speckled; never spirally grooved; not shouldered. Embryonic shell smooth; polished; with 1.500 whorls. Postnuclear whorls smooth. Suture normal, without narrow defined zone on beneath whorl. Last whorl almost straight in front; almost straight at periphery; with a rugate region with crowded and/or thickened growthline-like folds at abapertural side near aperture. Aperture in a plane and straight; subcircular; its insertions connected; almost vertical; completely attached to body whorl; with weak angular

tubercle; 1.8 mm high; 1.4 mm broad. Ratio of shell height to aperture height 4.38. Secondary aperture absent. Palatal tooth absent. Palatal margin rounded; toothless. Peristome thickened; expanded; reflexed, without distinct cuff. Parietal callus distinct. Parietal tooth absent. Palatal wall without deep depression or tooth of irregular shape. Columellar margin reflexed; with one prominent tooth which is expanded inward; not sinuous. Columella not truncate; vertical. Outer edge of columellar lip somewhat vertical. Umbilicus a narrow slit. Shell uniformly colored; brown. Apical whorls normally colored.

Genitalia. Vas deferens long; evenly thick; entering epiphallus subapically; entering epiphallus with distinct demarcation with epiphallus; entering epiphallus at some angle. Epiphallus moderately long; slightly narrowed towards proximal end; externally smooth; forming a few loops. Epiphallic caecum absent. Flagellum very short; knob-like; proximally normal; with tip blunt. Penis evenly thick; terminally entering epiphallus; thin-walled. Penial process absent. Penial appendix moderately long; branched off from proximal portion of penis; divided into sections (A-1 – A-5); with A-1 fused with A-2, A-3 distinct, and A-4 fused with A-5. A-1 short. A-5 short; convoluted. Penial retractor biramous; attached to diaphragm in close proximity to each other; with penial branch attaching to proxmal penis; with appendical branch attaching to A-1 + A-2. Additional retractor rather than penial or appendical absent. Muscular band connecting vagina and epiphallus absent. Atrium short; with strong atrial retractor. Free oviduct moderately long; longer than vagina. Vagina short; not swollen; straight; not lined with loose, spongy tissue; unpigmented. Bursa copulatrix duct moderately long; proximally straight. Bursa copulatrix in normal size; poorly defined. Diverticle absent. Measurement of genitalia. Penis 1.8 mm; epiphallus 3.5 mm; flagellum 0.1 mm; vas deferens 4.2 mm; vagina 0.5 mm; free oviduct 1.0 mm; duct of bursa copulatrix 1.8 mm; bursa copulatrix 0.4 mm; A-1 + A-2 0.8 mm; A-3 0.3 mm; A-4 + A-5 2.3 mm (HBUMM06584-specimen 1, holotype).

Taxonomic remarks. Generally the *Holcauchen* species have two columellar teeth of similar size (*H. rhaphis* (Möllendorff, 1901)) or of differentiated development (*H. micropeas* (Möllendorff, 1901) and *H. sulcatus* (Möllendorff, 1901)) and one more or less developed transversal palatal tooth / fold. The new species is particular for the extremely reduced armature of aperture. The only apertural tooth occurred on columella is large but is invisible from aperture. Unlike the congener also with one columellar tooth, i. e. *H. entocraspedius* (Möllendorff, 1901), the new species has no palatal tooth / fold and shows a nearly straight periphery. Anatomically the new species, unlike the congeners known so far, has no diverticle on the bursa copulatrix duct.

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中国四川北部一沟颈螺新种（柄眼目，艾纳螺总科）描述

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摘 要 描述了栖息于甘肃南部的陆生贝类艾纳螺科 1 新种，南坪沟颈螺 *Holcauchen nanping* sp. nov.。与各已知种相比，南坪沟颈螺的次体螺层最膨大；腭壁板齿及腔壁齿阙如；具 1 枚强壮轴唇齿；在生殖系统中，鞭状器小，乳突状；成荚器无盲囊；纳精囊管分支盲管缺乏。

关键词 艾纳螺总科，艾纳螺科，沟颈螺属，新种，四川.

中图分类号 Q959.212

南坪沟颈螺，新种 *Holcauchen nanping* sp. nov.（图 1 ~ 4）

鉴别特征 次体螺层最膨大；无腭壁板齿与腔壁齿；轴唇齿 1 枚，强壮。鞭状器小乳突状；成荚器无盲囊；纳精囊管分支盲管缺乏。

正模，HBUMM06584-specimen 1，具软体部的成体，四川省九寨沟县风成寺，2011-08-14，吴岷、徐沁、Prem B. Buhda 采。模式标本保存于河北大学博物馆。

词源：新种种名源自九寨沟县旧称“南坪”。